

In re Patent No.: 6,798,641 B

Issued: September 28, 2004

Inventors: Peter J. Hopper et al.

Application No.: 10/647,602

Filed: August 25, 2003

For: LOW COST, HIGH DENSITY

DIFFUSION DIODE-CAPACITOR

REQUEST FOR CERTIFICATE OF CORRECTION OF PATENT FOR PTO MISTAKE UNDER 37 C.F.R. §1.322(a)

> 353 Sacramento Street, Suite 2200 San Francisco, CA 94111 Telephone: (415) 772-4900

Facsimile: (415) 398-2890

Certificate
0CT 1 9 2004
of Correction

Commissioner for Patents

Attn: Decision and Certificate of Correction Branch

of the Patent Issue Division

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

Attached in duplicate is form PTO-1050 with at least one copy being suitable for printing.

On September 28, 2004, the above-identified Letters Patent was issued by the U.S. Patent Office with the original informal drawings which were first filed with the patent application on August 25, 2003.

Applicant requests a Certificate of Correction for the reasons set forth below:

- 1. As stated above, this application was filed on August 25, 2003, with informal drawings.
  - 2. On September 24, 2003, Applicant filed formal drawings in the application.

- 3. On March 1, 2004, the PTO issued an Office Action that included an objection to the drawings. A proposed drawing correction or corrected drawings were required in reply to the Office Action.
- 4. On May 27, 2004, Applicant mailed a response to the March 1, 2004, Office Action. This response included a proposed amendment to the <u>formal</u> drawing that had been filed on September 24, 2003. A copy of the response filed on May 27, 2004 is attached herewith as Attachment I.
- 5. On June 22, 2004, the PTO issued a Notice of Allowability stating that the drawings filed on August 26, 2003, i.e. the <u>informal</u> drawings filed with the <u>original</u> application, were accepted by the Examiner.
- 6. On July 9, 2004, Applicant mailed a Submission of Corrected Formal Drawings. The Submission of Corrected Formal Drawings document, a copy of which is attached hereto as Attachment II, noted the drawing objection previously raised by the PTO and Applicant's response thereto. The document also stated:

"To ensure that formal drawings are utilized in publication of the patent document for this application, Applicant submits a new sheet of formal drawings herewith that corresponds to the earlier filed formal drawings with proposed drawing correction included."

Applicants date-stamped return receipt postcard indicates that this communication to the Patent Office was received in the Patent Office on July 16, 2004.

As evident from the above-stated paragraphs, Applicant timely filed formal drawings in the above-referenced application. Therefore, for the reasons listed above, Applicant respectfully requests a Certificate of Correction be issued in this application showing the formal drawings as filed in the PTO, and as attached hereto.

OCT 2 0 2004 Atty Docket No.: NSC1-M3100 Please send the Certificate to:

Michael J. Pollock STALLMAN & POLLOCK LLP 353 Sacramento Street, Suite 2200 San Francisco, CA 94111

NATIONAL SEMICONDUCTOR CORPORATION is the assignee. The Assignment was recorded on <u>August 25, 2003</u>, on Reel <u>014480</u>, Frame <u>0119</u>.

The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. <u>50-1703</u>, under Order No. <u>NSC1-M3100</u>. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

STALLMAN & POLLOCK LLP

Date: October 6, 2004

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Michael J. Pollock (Reg. No. 29,098)

Attorneys for Applicant(s)



In re Patent No.: 6,798,641 **B1** 

Issued: September 28, 2004

Inventors: Peter J. Hopper et al.

Application No.: 10/647,602

Filed: August 25, 2003

For: LOW COST, HIGH DENSITY

DIFFUSION DIODE-CAPACITOR

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Commissioner for Patents

Attn: Decision and Certificate of Correction Branch

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Alexandria, VA 22313-1450

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  - 2. On September 24, 2003, Applicant filed formal drawings in the application.

- 3. On March 1, 2004, the PTO issued an Office Action that included an objection to the drawings. A proposed drawing correction or corrected drawings were required in reply to the Office Action.
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"To ensure that formal drawings are utilized in publication of the patent document for this application, Applicant submits a new sheet of formal drawings herewith that corresponds to the earlier filed formal drawings with proposed drawing correction included."

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As evident from the above-stated paragraphs, Applicant timely filed formal drawings in the above-referenced application. Therefore, for the reasons listed above, Applicant respectfully requests a Certificate of Correction be issued in this application showing the formal drawings as filed in the PTO, and as attached hereto.

Atty Docket No.: NSC1-M3100 QCT 2 0 2004

Please send the Certificate to:

Michael J. Pollock STALLMAN & POLLOCK LLP 353 Sacramento Street, Suite 2200 San Francisco, CA 94111

NATIONAL SEMICONDUCTOR CORPORATION is the assignee. The Assignment was recorded on <u>August 25, 2003</u>, on Reel <u>014480</u>, Frame <u>0119</u>.

The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 50-1703, under Order No. NSC1-M3100. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

STALLMAN & POLLOCK LLP

Date: October 6, 2004

Michael J. Pollock (Reg. No. 29,098)

Attorneys for Applicant(s)

# **CERTIFICATE OF CORRECTION**

Patent No.:

6,798,641 **B**1

Dated:

September 28, 2004

Inventors:

Peter J. Hopper et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

MAILING ADDRESS OF SENDER:

MICHAEL J. POLLOCK

STALLMAN & POLLOCK LLP

353 SACRAMENTO STREET, SUITE 2200

San Francisco, CA 94111

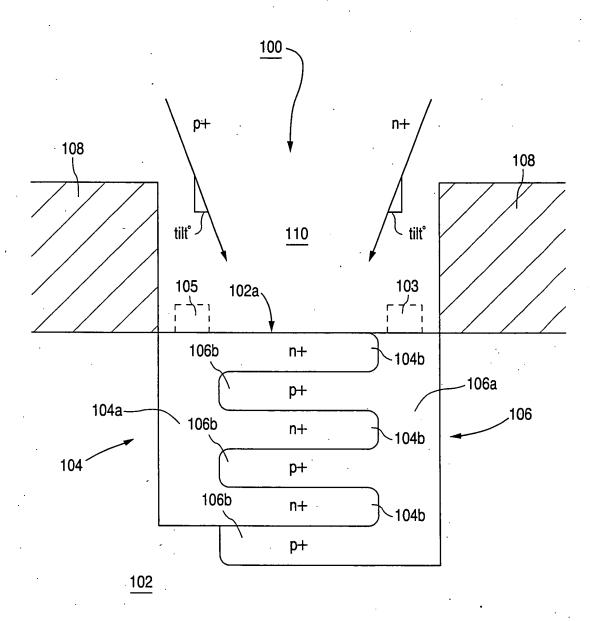


FIG. 1

# **CERTIFICATE OF CORRECTION**

Patent No.:

6,798,641 BI

Dated:

September 28, 2004

Inventors:

Peter J. Hopper et al.

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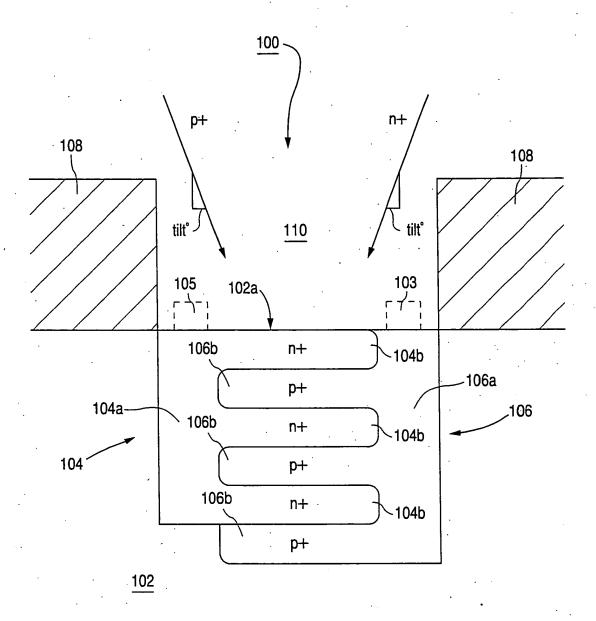


FIG. 1

Serial/Patent/Reg. No. 10 (647,602 S&P File In the Matter of the Application of: Peter J. Hopper Title/Mark: Low Cost, High Density Diffusion Date Mailed: 05 (27)04  The following has been received in the U.S. Patent and Trademark Office	e on the date stamped hereon:
Transmittal Letter X 2  Patent Application	Trademark (Use) Applin., Drawing  Tru Trademark Application and Drawing  Request for Extension to Time (trademark)  (Notice of Allowance:  Statement of Use/Amendment to Allege Use  Section 8 & 15 Declaration  Trademark Renewal Application andSpecimen  Opposition to  Petition for Cancellation  Certificate of Mailing  Express Mail Certificate No  Certificate under §3.73(b)  Certificate of Correction (PTO Form 1050)  Petition for  Other:



In re Patent Application of

Peter J. Hopper

Application No.: 10/647,602

Filed: August 25, 2003

For: LOW COST, HIGH DENSITY
DIFFUSION DIODE-CAPACITOR

Group Art Unit: 2831

Examiner: Nguyen T. Ha

CHANGE OF ATTORNEY OR AGENT'S ADDRESS IN APPLICATION (37 CFR 1.8(a))

> 353 Sacramento Street, Suite 2200 San Francisco, CA 94111 (415) 772-4900

Commissioner for Patents P.O. Box 1450

Alexandria, VA 22313-1450

**CERTIFICATE OF MAILING** 

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope, addressed to: Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on May 27, 2004.

STALLMAN & POLLOCK LLP

Dated: 05/27/04

Bv:

ana T. Brenner

Sir:

Please send all correspondence for this application to:

STALLMAN & POLLOCK LLP

Attn: Michael J. Pollock

353 Sacramento Street, Suite 2200

San Francisco, CA 94111 Customer No.: 28584

Please direct all telephone calls to:

Michael J. Pollock

Telephone: (415) 772-4900 Facsimile: (415) 398-2890

Respectfully submitted,

STALLMAN & POLLOCK LLP

Dated: May 27, 2004

Michael J. Pollock

Reg. No. 29,098

Attorneys for Applicant(s)

COPY

Atty Docket No.: NSC1-M3100 [P05660]

### STALLMAN & POLLOCK LLP 353 Sacramento Street, Suite 2200 San Francisco, CA 94111 (415) 772-4900

In re Patent Application of: Peter J. Hopper

Atty Docket No. NSC1-M3100 [P05660]

Application No.: 10/647,602 Filed: August 25, 2003

For: LOW COST. 1

LOW COST, HIGH DENSITY DIFFUSION DIODE-CAPACITOR

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

Transmittal herewith is an amendment in the above-identified application.

The fee has been calculated as shown below.

	CLAIMS		HIGHEST NO.	PRESENT	RATE	ADDITIONAL
	REMAINING	}	PREVIOUSLY	EXTRA		FEE
	AFTER AMENDMENT		PAID FOR			
TOTAL	6	MINUS	20		x \$18 =	\$0.00
INDEP.	2	MINUS	3	<u> </u>	x \$86 =	\$0.00
FIRST PRESENTATION OF MULTIPLE DEP CLAIMS					+ \$290	\$
			•		TOTAL	\$0.00

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	**	If the entry in Col. 1 is less than the entry in Col. 2, write "0" in Col. 3  If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.  If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, write "3" in this space. The "Highest Number Previously Paid For" (Total or Independent is the highest number found from the equivalent box in Col. 1 of prior amendment or the number of claims originally filed.)
1.		No additional fee is required.
2.		A check in the amount of \$ is attached.
3.		Please charge any additional fees, including any fees necessary for extensions of time or credit overpayment to Deposit Account No. 50-1703, under Order No. NSC1-M3100.  A duplicate copy of this sheet is enclosed.
4.		Petition for extension of time. The undersigned attorney of record hereby petitions for an extension of time pursuant to 37 C.F.R. § 1.136(a), as may be required, to file this response.
	•	STALLMAN & POLLOCK LLP

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on May 27, 2004.

Dated: 05/27/04

Dated: May 27, 2004

Lana T. Brenner

Michael J. Pollock
Attorneys for Applicant(s)



In re Patent Application of

Peter J. Hopper et al.

Application No.: 10/647,602

Filed: August 25, 2003

For: LOW COST, HIGH DENSITY DIFFUSION DIODE-CAPACITOR

Group Art Unit: 2831

Examiner: Nguyen T. Ha

RESPONSE TO OFFICE ACTION MAILED MARCH 1, 2004

353 Sacramento St., Suite 2200 San Francisco, CA 94111 (415) 772-4900

Mail Stop Amendment Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1650 CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope, addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1650, on May 27, 2004.

STALLMAN & POLLOCK LLP

Dated: 05/27/04

By:

I ana T Brenner

Sir:

In response to the Office Action mailed March 1, 2004, please amend the aboveidentified application as follows:

Amendments to the Specification are reflected in a substitute paragraph provided on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims that begins on page 3 of this paper.

A purposed amendments to the Drawing is enclosed herewith.

Remarks/Arguments begin on page 5 of this paper.



Atty Docket No.: NSC1-M3100 [P05660]

#### AMENDMENTS TO THE SPECIFICATION

Please amend the paragraph that begins at page 3, line 17 of the specification to read as follows:

Following the formation of the inter-digitated capacitor structure, a layer of aluminum or other conductive interconnect material is deposited over the capacitor structure and etched to provide a <u>first</u> conductive [contact] <u>electrode 103</u> to the N-type dopant region 104 [(see Fig. 1)] and a <u>second</u> conductive [contact] <u>electrode 105</u> to the P-type dopant region 106 [(see Fig. 1)]. The first conductive electrode 103 and the second conductive electrode 105 are shown in dashed lines in Fig. 1.



### **AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application.

# Listing of Claims

(Currently amended) A multiple-layer diffusion junction capacitor structure comprising:
 an N-type region formed in a semiconductor substrate and having an N-type
 vertical portion and a plurality of spaced-apart N-type fingers that extend from the N-type
 vertical portion; and

a P-type region formed in a semiconductor substrate and having a P-type vertical portion and a plurality of spaced-apart P-type fingers that extend from the P-type vertical portion, and

wherein the N-type fingers and the P-type fingers are inter-digitated <u>and in direct</u> contact.

- 2. (Currently amended) A multiple-layer diffusion junction capacitor structure as in claim 1, and further comprising:
- a first conductive [contact] <u>electrode</u> formed on an upper surface of the N-type region; and
  - a second conductive electrode formed on an upper surface of the P-type region.
- 3. (Original) A multiple-layer diffusion junction capacitor structure as in claim 2, and wherein both the first conductive electrode and the second conductive electrode comprise aluminum.
- 4. (Original) A method of forming an N-layer junction capacitor structure in a semiconductor substrate, wherein N is an integer, the method comprising:



forming a patterned mask on an upper surface of the semiconductor substrate, the patterned mask having at least one opening formed therein to expose an upper surface area of the semiconductor substrate;

forming a sequence of N alternating implants of P-type dopant and of N-type dopant at negative and positive implant angles, respectively, for a particular conductivity type dopant each implant being performed with a different energy and implant dose, thereby resulting in N inter-digitated layers of P-type dopant and N-type dopant formed in a semiconductor substrate; and

forming a first conductive electrode in electrical contact with the P-type dopant layers and a second conductive electrode in electrical contact with the N-type dopant layers.

- 5. (Original) A method as in claim 4, and wherein the patterned mask comprises silicon oxide.
- 6. (Currently amended) A method as in claim 4, and wherein the first and second conductive electrodes comprise [aluminum] aluminum.



#### REMARKS/ARGUMENTS

Reconsideration of the above-identified application is requested in view of the remarks that follow.

In the March 1, 2004, Office Action in this application, the Examiner rejected Claims 2 and 3 because of inconsistency between the language of original Claim 2 and the language of original Claim 3 with respect to the term "first conductive electrode."

As indicated above, Claim 2 has been amended to recite a "first conductive electrode" thereby eliminating the inconsistency between Claims 2 and 3.

The Examiner objected to the drawings under 37 CFR 1.83(a), stating that the claimed "first conductive contact" and "second conductive contact" are not showing in the drawings.

Attached hereto is a proposed amendment to Fig. 1 identifying a first conductive electrode 103 and a second conductive electrode 105, both of which appear in dashed lines in original Fig. 1. In addition, as indicated above, Applicant has amended the specification to more specifically recite the first conductive electrode 103 and the second conductive electrode 105.

The Examiner has rejected Claim 1 under 35 U.S.C. 102(b) as being anticipated by the Winters '964 patent. For the reasons set forth below, it is submitted that amended Claim 1 patentably distinguishes over the Winters teaching.

Specifically, as indicated in Fig. 1 of the application, the interdigitated capacitor structure recited in Claim 1 is formed "in" a semiconductor structure, as opposed to the stacked gate capacitor structure taught by Winters which is formed "on" a semiconductor substrate.

Furthermore, the alternating N-type and P-type regions disclosed by Winters are separated from one another by intervening dielectric material. In Applicant's Claim 1 invention, as shown in Fig. 1, as a result of the fabrication technique of alternating N+ implants and P+ implants, the N+ fingers 104b and the P+ fingers 106b are interdigitated, that is, they are in direct contact with one another. Claim 1 has been amended to clarify this feature of the Claim 1 invention.

Atty Docket No.: NSC1-M3100 [P05660]



For these reasons, it is believed that subject matter recited in Claim 1 patentably distinguishes over the Winters reference.

Although the Examiner has rejected Claims 2 and 3 under 35 U.S.C. 103(a) as being unpatenable over Winters in view of the Rao et al. '014 patent, since it is believed that amended Claim 1 distinguishes over the prior art, and since Claims 2 and 3 depend from Claim 1, it is submitted that Claims 2 and 3 also patentably distinguish over the prior art.

For the reasons set forth above, Applicant believes that all claims currently pending in this application patentably distinguish over the prior art. Therefore, it is requested that this amendment be entered and that the application be passed to allowance.

Respectfully submitted,

STALLMAN & POLLOCK LLP

Dated: May 27, 2004

Michael J. Pollock Reg. No. 29,098

Attorneys for Applicant(s)

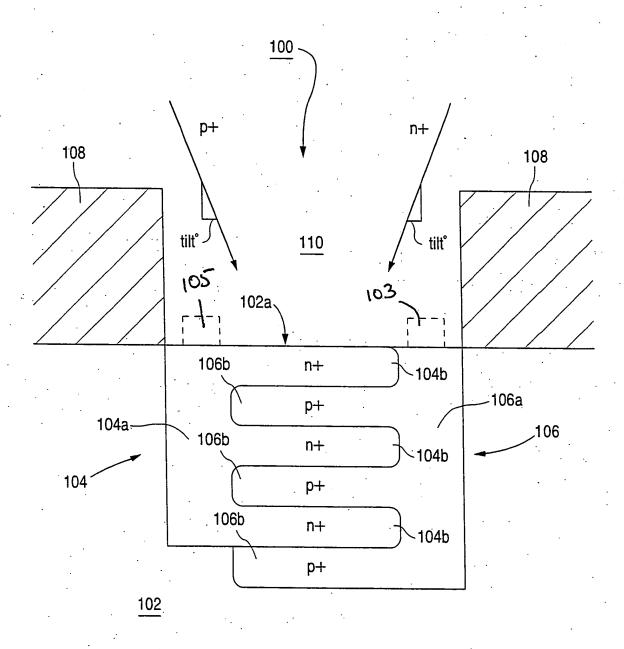


FIG. 1



Serial/Patent/Reg. No. 10/647,602  In the Matter of the Application of: Peter J. Hopper et al.  Title/Mark: Low Cost. High Density Diffusion Diode. Capacitor  Date Mailed: 07/09/04  The following has been received in the U.S. Patent and Trademark Office on the date stamped hereon:	. UT.
Transmittal Letter Patent Application pgs. specification including pgs. claims Prawings sheets formal informal Oath/Declaration Assignment w/ Form PTO-1595 Power of Attorney Small Entity Declaration Deposit Account Authorization (in duplicate) Information Disclosure Statement, PTO-1449 Check \$ Amendment/Response Request for Extension to Time ( Opposition to Certificate of Mailing Express Mail Certificate No Certificate of Correction (PTO Form 1050) Petition for Other:	



In re Patent Application of

Peter J. Hopper et al.

Application No.: 10/647,602

Filed: August 25, 2003

For: LOW COST, HIGH DENSITY DIFFUSION DIODE-CAPACITOR

Mail Stop PGPUB Drawings Commissioner for Patents Attn: Official Draftsperson P.O. Box 1450 Alexandria, VA 22313-1450 Confirmation No.: 2813

Group Art Unit: 2831

Examiner: Ha, Nguyen T

SUBMISSION OF CORRECTED FORMAL DRAWINGS

353 Sacramento Street, Suite 2200 San Francisco, CA 94111 (415) 772-4900

**CERTIFICATE OF MAILING** 

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope, addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on July 9, 2004.

STALLMAN & POLLOCK LLP

Dated 7/9/04

By:\_\_\_\_\_\_\_\_\_

Sir:

Enclosed herewith is one (1) sheet of formal drawing that Applicant submits for publication with the formal patent document for the above-referenced application.

This application was filed on August 25, 2003, with informal drawings.

On March 1, 2004, the Examiner issued an Office Action in the application objecting to the drawings as failing to show every feature of the invention specified in the claims. The Examiner further stated: "A proposed drawing correction or corrected drawings are required in reply to the Office Action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance."

On May 27, 2004, Applicant filed a response to the Office Action mailed March 1, 2004. The response included a proposed amendment to Figure 1.



On June 22, 2004, the Examiner issued a Notice of Allowance in the application, stating: "The drawings filed on 26 August 2003 are accepted by the Examiner." As stated above, the drawings filed with the original application on 25 August 2003 were informal drawings. It was assumed that the informal drawings were superceded by the formal drawings filed on 27 May 2004 (with the proposed correction).

To ensure that formal drawings are utilized in publication of the patent document for this application, Applicant submits a new sheet of formal drawings herewith that corresponds to the earlier filed formal drawings with proposed drawing correction included.

Should there be any questions regarding this matter, it is requested that the undersigned be contacted immediately at (415) 772-4900.

Respectfully submitted,

STALLMAN & POLLOCK LLP

Dated: July 9, 2004

Michael J. Pollock Reg. No. 29,098

Attorneys for Applicant(s)



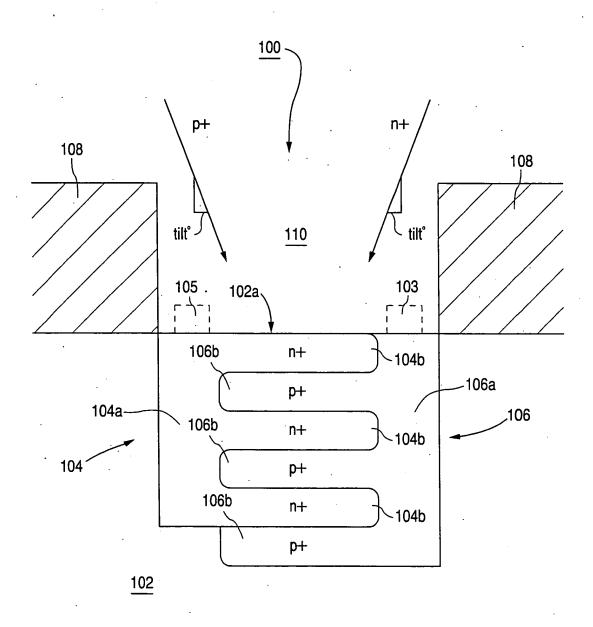


FIG. 1

